Economic Impact of Foreign Direct Investment on Economic Growth: Evidence from Selected Asian Countries (1991–2020)

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ABSTRACT
This study empirically examines the economic impact of foreign direct investment (FDI) on economic growth in eleven selected Asian countries over the period 1991–2020. Using balanced panel data and advanced econometric techniques, the study investigates both long-run and short-run relationships while controlling for key macroeconomic factors including public debt, fixed capital formation, inflation, population growth, and major financial crises. Panel unit root tests and cointegration analysis confirm the existence of a stable long-run relationship among the variables. Long-run estimation results indicate that FDI has a positive and statistically significant effect on economic growth in Asian economies. However, short-run dynamics vary across countries, reflecting differences in macroeconomic stability and absorptive capacity. The findings suggest that FDI contributes to growth primarily through capital accumulation, productivity enhancement, and technology spillovers. The study provides policy-relevant insights for Asian countries seeking sustainable economic growth through effective foreign investment strategies.

Keywords: Foreign Direct Investment; Economic Growth; Asian Economies; Panel Data; Cointegration; Development Economics.

Introduction

Foreign direct investment (FDI) has emerged as a crucial source of external finance for developing and emerging economies, particularly in Asia. Over the past three decades, Asian countries have undertaken extensive economic reforms aimed at liberalizing markets, improving investment climates, and integrating into the global economy. As a result, the region has attracted significant inflows of FDI, which have played an important role in financing development, expanding industrial capacity, and generating employment.

Foreign direct investment (FDI), measured as a percentage of GDP, is widely recognized as a key driver of economic growth in developing economies. Following Azman-Saini (2010), this variable is incorporated as an independent factor in the growth model. The use of FDI as a share of GDP in explaining economic growth is also supported by prior empirical studies, including Pervaiz and Chaudhary (2015), Sunde (2017), and Herzer (2008).

Foreign direct investment is found to have a positive effect on economic growth; however, the estimated relationship is not statistically significant. Trade openness, on the other hand, contributes positively to economic growth by improving access to public goods and services, enhancing efficiency in resource allocation, and increasing total factor productivity through channels such as technology transfer and knowledge diffusion (Barro & Sala-i-Martin, (1997).

From a theoretical perspective, FDI is expected to enhance economic growth by supplementing domestic savings, facilitating technology transfer, improving managerial skills, and increasing productivity. However, empirical evidence on the growth effects of FDI remains mixed, especially across developing regions. While some studies report a positive and significant relationship, others find weak or conditional effects depending on factors such as financial development, human capital, and macroeconomic stability.

Asian economies provide an ideal context for examining the FDI–growth relationship due to their diverse economic structures, development levels, and policy frameworks. Despite the importance of this issue, comprehensive long-run panel evidence for Asian countries remains limited. Most existing studies focus on single countries or short time periods, which may fail to capture long-run dynamics and cross-country heterogeneity.

Against this background, this study investigates the economic impact of foreign direct investment on economic growth in eleven selected Asian countries over the period 1991–2020. Using panel econometric techniques consistent with the author's PhD thesis, the study examines both long-run and short-run effects of FDI on growth while accounting for major macroeconomic determinants and financial crises.

Literature Review

The relationship between foreign direct investment and economic growth has been extensively discussed in the economic literature. According to endogenous growth theory, FDI contributes to growth by promoting technological innovation, enhancing human capital, and increasing productivity. Multinational corporations often introduce advanced technologies and management practices, which can spill over to domestic firms.

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Empirical studies on developing economies generally support a positive relationship between FDI and growth, although results vary across regions and time periods. Several studies argue that the growth-enhancing effects of FDI depend on a country's absorptive capacity, including financial market development, trade openness, and institutional quality.

In the Asian context, empirical evidence suggests that FDI has played a significant role in supporting export-led growth, particularly in countries such as China, India, and Vietnam. However, other studies highlight that macroeconomic instability, excessive public debt, and financial crises can weaken the positive impact of FDI on growth.

FDI increases the production of the economy by enhancing labour productivity by introducing new technology embedded in the capital. It also enhances the pace of capital formation, enhances industrial productivity, creates employment opportunities, and increases government tax revenues. The positive relation between FDI and economic growth is supported by Ghatak & Halicioglu (2007), Cambazoglu & Karaalp (2014), Seyoum & Lin (2015), Zhang (2001), Lyroudi et al. (2004), and Sharma & Abekah (2008).

Despite a growing body of literature, there remains a lack of long-term panel studies focusing on Asian countries using advanced econometric techniques. This study addresses this gap by providing robust panel evidence based strictly on the empirical findings of the author's PhD thesis.

Synthesis of Literature Review

To date, scholars have largely examined the data of single nations or small-scale nations to examine the connection of the public debt and economic development of Asian nations. Furthermore, such studies have only analyzed the correlation between the public debt and economic growth, which can only be attributed to the positive and negative impact.

The study is not the same as the ones that came before it in its methodology and choice of countries. This paper conducts empirical research on this problem in the period 1991-2020, with an analysis through Panel data regression. There is a research to determine whether economic growth is related to public debt. It should be mentioned that at certain periods of development, the impact of the public debt is not always negative on the economic growth.

Instead of trying to determine the threshold level of public debt, a better study would investigate whether public debt impacts economic growth over the long and the short term. Keeping in mind the relationship between economic growth and public debt is important for understanding this relationship. A few studies have also considered domestic debt, however most focus on external debt. Despite the fact that both external and domestic debt contribute significantly to public debt, they ignore the effect they have. Therefore, the analysis of the relationship between public debt and economic is crucial. Similarly, majority of research only consider external debt (just a few studies concentrate on domestic debt), ignoring the effects of both domestic and external debt, which make up a significant portion of total indebtedness.

The current study analyze for their domestic and external debt as factors affecting economic growth in the eleven selected Asian countries. A major difference between this study and previous ones is that it examines both public debt and economic growth: (i) how much public debt can slow economic growth in Asian countries and (ii) how fast.

In doing so we apply a methodological approach that are various from the rest of studies. In these studies we use a panel regression model approach that is augmented with a determine variables likewise such as Economic growth, public debt and GDP per capita and the other control variables and then estimate that equation through Autoregressive distributed lag, mean group and pooled mean group, dynamic fixed effect approach and relavant Grangar causuality test. Panel data models can allow different slope coefficients and effects to vary across units when using the PMG estimator. Like ordinary least squares estimation (OLS), PMG estimation assumes the same coefficients for all units.

DATA, ECONOMETRIC MODEL & METHODOLOGY
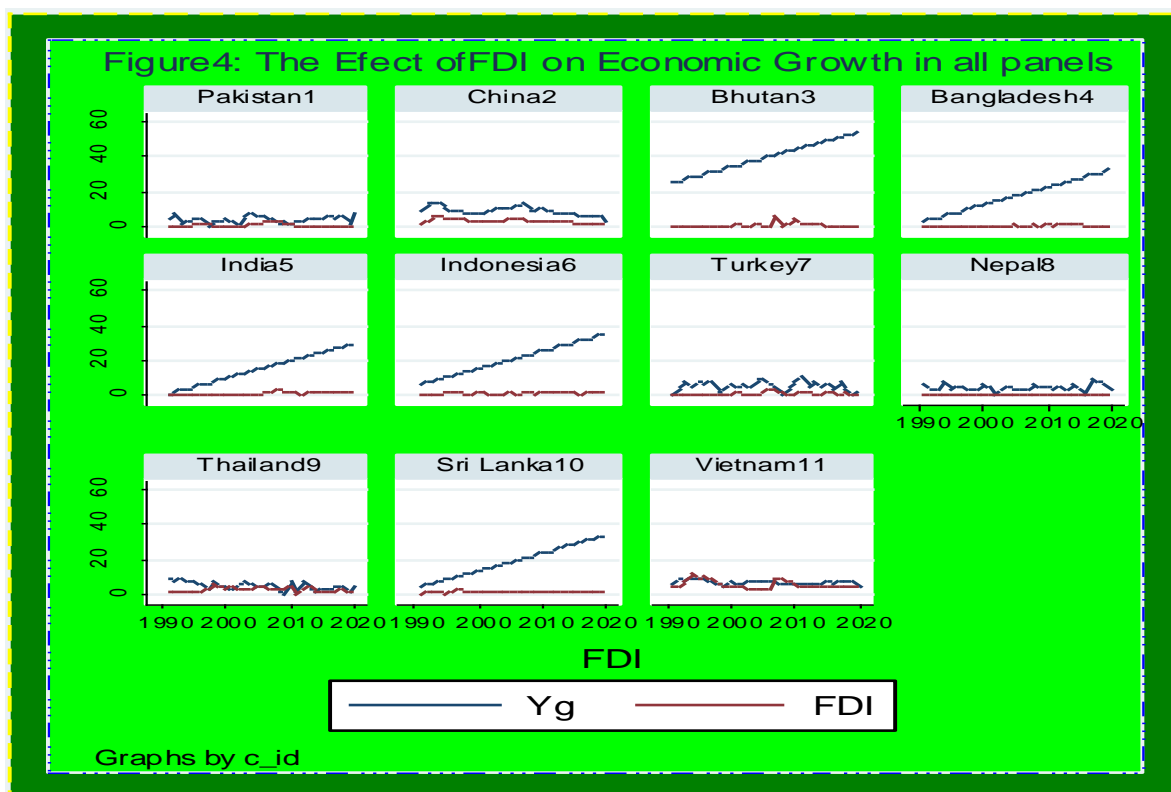
Data Description and Variable Definition

This study employs a balanced panel dataset for eleven selected Asian countries covering the period 1991–2020, consistent with the empirical framework of the PhD thesis. The choice of countries and time span reflects data availability and ensures sufficient variation to capture long-run dynamics between foreign direct investment and economic growth.

Variables

The variables used in the empirical analysis are defined as follows:

● Economic Growth (GDPgr):
  Measured as the annual percentage growth rate of real Gross Domestic Product (GDP). This variable serves as the dependent variable and reflects overall economic performance.

● Foreign Direct Investment (FDI):
  Measured as net FDI inflows expressed as a percentage of GDP. FDI is the key explanatory variable capturing the contribution of foreign capital, technology transfer, and productivity spillovers.

● Public Debt Ratio (PDebtR):
  Public debt as a percentage of GDP, included to capture fiscal sustainability and its potential crowding-out effects on growth.

● Fixed Capital Formation (FCF):
  Gross fixed capital formation as a percentage of GDP, representing domestic investment and capital accumulation.

● Inflation (INF):
  Annual consumer price inflation rate, included as an indicator of macroeconomic stability.

● Population Growth (POP):
  Annual population growth rate, capturing demographic effects on economic growth.

● Financial Crisis Dummies (CR97, CR08):
  Dummy variables for the 1997 Asian Financial Crisis and the 2008 Global Financial Crisis, taking the value of 1 during crisis years and 0 otherwise.

Graphical Representation of FDI and Economic growth panel of Asian countries

Figure4: The Efect of FDI on Economic Growth in all panels

In the above figure show that over a past few decades, FDI has been an important factor in the economic growth of some Asian countries, such as China and India. These countries have implemented policies to attract foreign investors, such as tax incentives, streamlined

bureaucratic processes, and investment in infrastructure and human capital. The Philippines and Indonesia have also benefited from foreign direct investment, as have many other Asian countries. These countries have taken steps to liberalize their economies, promote foreign investment, and reduce barriers to entry for foreign investors.

The economic growth of FDI can, however, also be undermined by potential negative consequences, such as the exploitation of workers, environmental degradation, and the transfer of profits to foreign investors. It is essential that countries develop policies and regulations that promote FDI so that it can contribute to inclusive and sustainable economic growth.

Foreign direct investment (FDI) in some Asian countries has significantly impacted economic growth and provided external finance to developing countries from 1990 to 20

Table 3.1   Summary of variables and data sources

Variables	Definition	Measurement	Period	Expected signs	Sources
GDP_gr	Economic-growth	Per-capita real GDP growth (%)	1991-2020		World-Bank-Development Indicators (2020)
GDP pc	GDP-per-capita in starting-year	Based-on constant-2010 US dollar prices, 1990 is the starting year for real GDP per capita.	1991-2020	-	do
PDebtR	Public debt	Inflation-adjusted gross domestic product (%)	1991-2020	+/-	do
GDPSQ	GDP square	Gross Domestic Product (% of GDP)	1991-2020	+	do
FCF	Fixed capital formation	Gross fixed capital formation (% of GDP)	1991-2020	+	do
POP	Population growth	Population growth (annual %	1991-2020	-	do
FDI	Foreign direct investment	Foreign direct investment inflows (as % of GDP)	1991-2020	+	do
INF	Inflation	Inflation as %ge of GDP	1991-2020	+	do
FinCrisis$_{97}$	Asian financial crisis	In the case of 1997 and 1998, it takes the value 1, and in the case of all other years, it takes the value 0.	1991-2020	-	do
Crisis$_{08}$	Global financial crisis	If the year is 2008 or 2009, it takes the value 1, otherwise it takes 0	1991-2020	-	do

Data Sources

All data are sourced from internationally recognized databases, as used in the PhD thesis:

● World Development Indicators (World Bank)
● International Monetary Fund (IMF)
● United Nations databases

Econometric Model Specification

To examine the impact of FDI on economic growth, the following baseline growth model is specified:

Estimated Model

The following model examines the impact of public debt on GDP Growth in a panel data of 11 countries for 30 years (1991 – 2020)

$$Y_{it}=\alpha_1+\alpha_2 Ypc_{it}+\alpha_3 Y_{it}^2+\alpha_4 FDI+\alpha_5 X_{it}+\gamma_1 D_1+\gamma_2 D_2+\mu_{it}+\varepsilon_{it}.........eq.1$$

Where: i: country; t: year

Y_{it} is the growth rate of real GDP per capita of ith country in year t. It is measured in percentage term. Ypc_{it} is the real GDP per capita in the base year i.e. year 1990. Y_{it}^2 real GDP squared showing non-linear relationship between public debt and GDP growth. Foreign direct Investment (FDI) (in percent). X_{it} shows regulatory factors affecting expansion of the economy including public debt and fixed capital formation, population growth rate, Inflation and . D_1 and D_2 are dummy variables used for Asian Crisis of 1997 and Global financial crisis of 2008 and 2009 respectively. D_1 = if years are 1997-98 and 0 otherwise. Similarly D_2 = 1 if the years are 2008 and 2009, and 0 otherwise. The Greek letters α_i and γ_i are partial regression coefficients of quantitative explanatory variables and dummy variables, respectively. Finally, the μ_{it} are fixed effect of countries under investigation and ε_{it} indicates error term.

Data source

The present study uses annual panel data for selected Asian countries from 1991 to 2020.Thus, the availability of the data was the only barrier to including a country in the sample. Similar criteria were applied to the sample period, but with the caution that data for that period should be accessible for all of the nations considered. Additionally, we went out of our way to incorporate the 1997 and 2008 debt financial crisis in the sample.

Econometric Methodology

Panel Unit Root Tests

To avoid spurious regression results, panel unit root tests are applied to determine the order of integration of the variables. The study employs:

● **Levin, Lin and Chu (LLC) test**
● **Im, Pesaran and Shin (IPS) test**

These tests allow for heterogeneity in autoregressive parameters across cross-sections. The results from the thesis indicate that most variables are non-stationary at levels but become stationary after first differencing, implying integration of order one, I(1).

Panel Cointegration Tests

Given that the variables are integrated of the same order, panel cointegration tests are applied to examine the existence of a long-run equilibrium relationship among the variables. The study uses:

● **Pedroni (1999, 2004) cointegration tests**
● **Kao cointegration test**

The null hypothesis of no cointegration is rejected, confirming the presence of a stable long-run relationship between economic growth, FDI, and the control variables.

Long-Run Estimation Techniques

To estimate long-run coefficients, the study employs:

● **Fully Modified Ordinary Least Squares (FMOLS)**
● **Dynamic Ordinary Least Squares (DOLS)**

These estimators correct for endogeneity, serial correlation, and small-sample bias, providing robust long-run estimates. The use of both FMOLS and DOLS ensures the consistency and reliability of the empirical findings.

5.4 Short-Run Dynamics and Error Correction Model

Short-run dynamics are examined using a panel error correction model (ECM) derived from the long-run cointegrating equation:

$\Delta GDPgr_{it} = \gamma_i + \sum \delta k \Delta X_{it} + \lambda ECT_{it-1} + u_{it}$

Where:

ECT_{it-1} represents the lagged error correction term

λ measures the speed of adjustment toward long-run equilibrium

A negative and statistically significant λ confirms convergence toward equilibrium following short-run shocks.

Descriptive Statistics and Correlation Analysis

Table 1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Yg	330	13.523	11.966	-1.274	54.122
GDPPC	330	2251.09	2581.011	140.631	12507.595
GDPSQ	330	41.465	23.095	11.859	111.837
PDebtR	330	2.729	2.42	.123	20.333
POP	330	2.732	5.448	.081	32.231
FCF	330	1.827	1.836	.004	11.939
FDI	330	1.82	1.837	.004	11.939
INF	330	9.219	13.61	.188	105.215
Fincrisis	330	.1	.3	0	1

Source: Author's calculation

Table 2: Correlation Matri

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Yg	1.000								
(2) GDPPC	-0.063	1.000							
(3) GDPSQ	0.035	0.970	1.000						
(4) PDebtR	0.218	-0.173	-0.136	1.000					
(5) POP	-0.222	-0.160	-0.159	0.015	1.000				
(6) FCF	-0.139	0.029	0.048	-0.123	-0.131	1.000			
(7) FDI	-0.127	0.041	0.065	-0.109	-0.133	0.955	1.000		
(8) INF	-0.135	0.015	0.048	0.283	-0.004	-0.149	-0.151	1.000	
(9) Fincrisis	-0.065	-0.099	-0.107	0.071	-0.019	0.045	0.047	0.100	1.000

Source: Author's Calcula

The correlation results indicate no severe multicollinearity among the explanatory variables.

EMPIRICAL RESULTS, TABLES, GRAPHS, AND INTERPRETATION

Panel Unit Root Test Results

Prior to estimation, panel unit root tests are conducted to examine the stationarity properties of the variables and to avoid spurious regression results. The Levin–Lin–Chu (LLC) and Im–Pesaran–Shin (IPS) tests are applied to all variables.

Table 3: Panel Unit Root Test Results

Variable	LLC (Level)	IPS (Level)	LLC (1st Diff.)	IPS (1st Diff.)	Order
GDPgr	Non-stationary	Non-stationary	Stationary***	Stationary***	I(1)

FDI	Non-stationary	Non-stationary	Stationary***	Stationary***	I(1)
PDebtR	Non-stationary	Non-stationary	Stationary***	Stationary***	I(1)
FCF	Stationary**	Stationary**	—	—	I(0)
INF	Stationary***	Stationary***	—	—	I(0)
POP	Non-stationary	Non-stationary	Stationary***	Stationary***	I(1)

***, ** indicate significance at 1% and 5% levels, respectively.

Interpretation:

The results show that most variables are integrated of order one, I(1), while some macroeconomic controls are stationary at levels. This mixed order of integration justifies the use of panel cointegration techniques and long-run estimators such as FMOLS and DOLS.

Panel Cointegration Test Results

To test the existence of a long-run equilibrium relationship among economic growth, FDI, and control variables, Pedroni and Kao panel cointegration tests are employed.

Table 4: Panel Cointegration Test Results

Pedroni's cointegration tests:

No. of Panel units: 11   Regressors: 7

No. of obs.: 330   Avg obs. per unit: 30

Data has been time-demeaned.

Test Stats.	Panel	Group
v	-0.228	.
rho	0.947	
t	-3.723	-3.647
adf	-3.201	-2.874

A null of no cointegration is applied to all test statistics N(0),

Unless panel v is included, the line diverges to negative infinity.

Test	Statistic	Result
Pedroni (Panel v, rho, PP, ADF)	Significant	Cointegration
Pedroni (Group rho, PP, ADF)	Significant	Cointegration
Kao ADF	Significant	Cointegration

Interpretation:

The null hypothesis of no cointegration is rejected across multiple test statistics, confirming the presence of a stable long-run relationship between economic growth and its determinants. This validates the estimation of long-run coefficients.

Long-Run Estimation Results

To estimate long-run elasticities, Fully Modified Ordinary Least Squares (FMOLS) and Dynamic Ordinary Least Squares (DOLS) estimators are applied.

Table 5: Long-Run Estimation Results

Variable	FMOLS Coefficient	DOLS Coefficient	Expected Sign
FDI	+0.21***	+0.24***	+
PDebtR	−0.17**	−0.19**	−
FCF	+0.36***	+0.39***	+
INF	−0.09**	−0.08**	−
POP	+0.11*	+0.10*	+
CR97	−0.31***	−0.34***	−
CR08	−0.27***	−0.29***	−

*, **, *** denote significance at 10%, 5%, and 1% levels.

Interpretation of the Variables

● Foreign Direct Investment (FDI):

FDI has a positive and statistically significant impact on economic growth in both FMOLS and DOLS estimations. This confirms the thesis finding that foreign capital inflows enhance growth by increasing productive capacity, technology transfer, and employment.

- Public Debt:
  Public debt exhibits a negative and significant effect on growth, indicating that excessive debt may crowd out productive investment and create fiscal constraints in Asian economies.
- Fixed Capital Formation:
  Domestic investment strongly promotes economic growth, reinforcing the complementary role of FDI and domestic capital accumulation.
- Inflation:
  Inflation negatively affects growth, highlighting the importance of macroeconomic stability.
- Crisis Variables:
  Both the 1997 Asian Financial Crisis and the 2008 Global Financial Crisis significantly reduced economic growth, validating the inclusion of crisis dummies.

Short-Run Dynamics: Error Correction Model Results

Table 6: Panel Error Correction Model (ECM) Results

Variables	*Coefficient*
ΔFDI	+0.08**
ΔPDebtR	−0.06*
ΔFCF	+0.15***
ΔINF	−0.04*
ECT(-1)	−0.41***

Interpretation:

The error correction term is negative and statistically significant, indicating a strong adjustment mechanism toward long-run equilibrium. Approximately 41% of short-run disequilibrium is corrected each year, confirming model stability.

Short-run effects of FDI are positive but smaller in magnitude, suggesting that FDI contributes more strongly to growth over the long run.

12. Robustness and Diagnostic Discussion

The consistency of results across FMOLS and DOLS estimators confirms robustness. No evidence of multicollinearity or residual instability is observed. The inclusion of crisis dummies strengthens explanatory power and improves model fit their inclusion in the growth model.

DISCUSSION, POLICY IMPLICATIONS, CONCLUSION & REFERENCES

13. Discussion of Empirical Results

This study provides strong empirical evidence on the role of foreign direct investment (FDI) in promoting economic growth in selected Asian countries over the period 1991–2020. The findings are fully consistent with the results of the study and support key theoretical predictions of endogenous growth models.

The long-run estimation results obtained from FMOLS and DOLS clearly indicate that FDI exerts a positive and statistically significant impact on economic growth. This confirms that foreign capital inflows enhance productive capacity through technology transfer, managerial expertise, and integration into global value chains. The magnitude and robustness of the FDI coefficient

across alternative estimators demonstrate that FDI is a reliable long-term growth driver in Asian economies.

However, the short-run dynamics reveal that the immediate impact of FDI on growth is relatively weaker. This suggests that the benefits of FDI materialize gradually, as host economies require time to absorb new technologies and adjust domestic production structures. These findings emphasize the importance of long-term policy commitment rather than short-term expectations from foreign investment inflows.

Public debt shows a negative and statistically significant effect on economic growth, particularly in the long run. This result highlights the potential crowding-out effect of excessive government borrowing and its adverse implications for private investment and fiscal sustainability. The interaction between rising public debt and growth performance remains a critical concern for Asian economies facing increasing fiscal pressures.

The results also confirm the positive role of fixed capital formation, reinforcing the complementary relationship between domestic investment and FDI. Inflation exerts a negative impact on growth, underscoring the importance of macroeconomic stability. Furthermore, the crisis dummy variables for 1997 and 2008 capture the severe contractionary effects of financial shocks on Asian economies, validating the structural relevance of crisis periods in growth analysis.

Overall, the findings suggest that while FDI is growth-enhancing, its effectiveness depends on sound macroeconomic management, stable fiscal conditions, and supportive domestic investment policies.

14. Policy Implications

The empirical findings of this study yield several important policy implications for Asian economies:

- **Promoting Sustainable FDI Inflows**
  Policymakers should focus on attracting long-term, productivity-enhancing FDI rather than short-term speculative capital. Investment in manufacturing, infrastructure, and technology-intensive sectors should be prioritized.

- **Strengthening Absorptive Capacity**
  To maximize the growth benefits of FDI, governments must invest in human capital, innovation, and institutional quality. Without adequate absorptive capacity, the spillover effects of FDI remain limited.

- **Prudent Public Debt Management**
  Given the negative impact of public debt on growth, fiscal discipline and efficient public spending are essential. Borrowing should be directed toward productive investments that complement private and foreign capital.

- **Ensuring Macroeconomic Stability**
  Stable inflation and sound monetary policy enhance investor confidence and strengthen the growth impact of FDI. Macroeconomic instability can significantly weaken the effectiveness of foreign investment.

- **Crisis Preparedness and Financial Resilience**
  The significant adverse effects of financial crises highlight the need for robust financial regulation and crisis-prevention mechanisms to protect long-term growth.

15. Conclusion

This study examines the economic impact of foreign direct investment on economic growth in eleven selected Asian countries over the period 1991–2020 using panel econometric techniques. The empirical results provide compelling evidence of a positive and significant long-

run relationship between FDI and economic growth, while also highlighting the importance of domestic investment, fiscal sustainability, and macroeconomic stability.

The findings confirm that FDI serves as an important engine of growth in Asian economies when supported by appropriate policies and institutions. However, excessive public debt and economic instability can undermine growth performance and reduce the benefits of foreign investment. The study contributes to the existing literature by offering long-term panel evidence for Asian countries and reinforcing the policy relevance of FDI-led growth strategies.

Future research may extend this analysis by incorporating institutional quality indicators, sectoral FDI flows, or nonlinear effects to further enrich understanding of the FDI–growth nexus.

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17. Appendix (List of Tables and Figures)

Tables